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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : G06F 17/60	A1	(11) International Publication Number: WO 98/08176 (43) International Publication Date: 26 February 1998 (26.02.98)
(21) International Application Number: PCT/US97/14343 (22) International Filing Date: 15 August 1997 (15.08.97)		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).
(30) Priority Data: 60/024,179 20 August 1996 (20.08.96) US 08/909,075 14 August 1997 (14.08.97) US		
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(54) Title: PROOFING SYSTEM UTILIZING DYNAMIC PDF TECHNOLOGY FOR THE INTERFACE FOR TEMPLATED PRINTING		
(57) Abstract		
<p>A technique for easily creating and proofing customized printed material before printing on a production printing system. A user may connect with an internet web site provided by a commercial printing service and select from a plurality of available templates for the printed material. The user can then select additional stored information to be included in the customized printed material, or can input variable information through a keyboard or the like. A portable document format (PDF) builder generates a dynamic PDF file from the selected template and the selected or variable data from the user. The dynamic file can then be displayed at the front end to provide an accurate view of how the printed material would look. Additionally, a hard copy proofing version of the printed material may be printed at the front end. Once the layout of the printed material is confirmed, a production printing system is used to print multiple copies of the customized printed material.</p>		
<pre>graph TD A[ACCESS WEB PAGE AND ENTER AREA FOR CUSTOM DESIGN] --> B[SELECT AVAILABLE TEMPLATE] B --> C[ENTER USER INFORMATION AND GENERATE DYNAMIC PDF FILE] C --> D[VIEW DYNAMIC PDF VERSION OF CUSTOM MATERIAL] D --> E{PRINT LOW RESOLUTION PROOF?} E -- YES --> F[PRINT ON LOCAL PRINTER] E -- NO --> G{CONFIRM PRINT ORDER?} G -- YES --> H[RUN COMMERCIAL PRINT JOB] G -- NO --> I[DELIVER CUSTOM PRINTED MATERIALS]</pre>		

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**PROOFING SYSTEM UTILIZING DYNAMIC PDF
TECHNOLOGY FOR THE INTERFACE FOR TEMPLATED PRINTING**

5 CROSS REFERENCE TO RELATED APPLICATION

This application claims the benefit of United States provisional patent application No. 60/024,179, filed August 20, 1996, which is hereby incorporated by reference in its entirety.

10

BACKGROUND OF THE INVENTION

The present invention relates to a technique for creating customized documents or other printed materials. More particularly, the present invention relates to a 15 technique for creating customized printed materials utilizing template formats, stored reference information and user input data.

It is desirable in modern printing systems to allow a user to readily customize printed materials for a particular need. For example, a user may select stored images and combine them with user specified input text and stored references to produce a 20 point of sale (POS) display or the like. Such a "response on demand" system increases production flexibility and simplifies the design process. With the growing importance and availability of the Internet, the possibilities of such a response on demand system increase greatly.

National or regional retail chains, for example, often require large numbers of 25 point of sale displays for use in their stores. These point of sale displays are typically printed to order by a commercial printing service and distributed to the various stores for use. Other types of businesses or organizations which frequently utilize point of sale displays include soft drink bottlers or major breweries that provide promotional materials to networks of distributors, cellular telephone service providers, trade 30 associations, and others.

The need for customized printed materials, of course, extends beyond point of sale displays. For example, direct mail marketers continually develop advertising flyers

and coupons which are sent through the mail to prospective customers. Event planners and promoters may need printed materials for use in promoting concerts, sporting events, live theatrical performances, etcetera. Similarly, various organizations sometimes utilize custom printed materials to announce seminars, annual meetings, 5 and the like. In other words, the possible applications for customized printed materials are virtually unlimited.

Custom promotional materials often change on a weekly (or even more frequent) basis. Additionally, it is common for a user to need the materials in a short time frame or to desire changes at the last minute. Accordingly, it is desired to provide a system 10 for creating customized documents which permits optimal flexibility in design, and which promotes efficiency by allowing a user to easily create, proof and edit custom printed materials in a single session.

Customized printed materials, particularly when ordered in large quantities, can cost substantial sums of money. As a result, it is especially important to ensure that the 15 design of the customized printed materials is satisfactory before large volume print jobs are run and delivered. If the design is not verified prior to printing, it may be necessary to incur additional expenses associated with redesigning and reprinting the order or, alternatively, a user may be forced to accept a less than optimal finished product. Thus, an accurate and simple technique for proofing customized printed materials prior 20 to confirming print job orders is desired.

Variable printing capabilities utilizing existing XLC printing technology may be demonstrated for response-on-demand applications. In such a system a user can connect to an Internet WEB site and make a request for a publication by providing some variable or selectable data that would be used to create a form based on the 25 layout instructions. The final document would then be assembled for later printing. The available selections may be generated from a database which contains the references, possibly some other object specific data, and, if graphic images are required, the low and high resolution images.

After the data was provided, such a system could then build dynamic HTML (Hypertext Mark-up Language) pages for viewing in the internet browser and proofing. The pages may be built on the references selected by the user on the main HTML page. The low resolution images of the referenced images could be used in building 5 the dynamic HTML page. However, attempts to mimic the real layout of the document to be ultimately printed are difficult because with the HTML standard there is a limit of how closely the HTML pages match the final printed pages in appearance. Moreover, differences in appearance are usually device dependent and may vary from user to user.

10 If the selections were confirmed, the records with the selections that consisted of the references to the selectable objects (including the images) from the database and the user provided variable data (name, address, etc.) were fed into the XLC system, which uses the template information, high resolution images referenced on the records, and the variable data from the records to do the final printing.

15 One problem with this system is that the printed pages do not always look the way the users thought they would based on a viewing of the HTML page. As a result, the finished product may prove unsuited for its intended purpose, and the customer would need to redesign the printed materials – costing time, money and effort. Accordingly, a proofing system that would accurately show the users how their 20 selections would look in print before the orders were sent for printing is highly advantageous.

BRIEF SUMMARY

In accordance with one aspect of the present invention, users are provided with 25 a visual representation of a template for customized printed materials before user data is entered so the user can better understand and visualize how the data will ultimately be placed in the final document. The templates may be imaged and then presented on an HTML internet web page in Portable Document Format (PDF). The users could see

the templates on the HTML page. However, the user still needs a tool to show the documents after entry of the custom data.

In accordance with another aspect of the present invention, a dynamic PDF solution creates a dynamic PDF file on-the-fly based on the template information, the variable data provided by the users, and the low resolution images based on the references selected. The PDF file provides a proofing version of the customized material, and is generated by an application that directly reads and writes a PDF file, by inserting the components and placing them at the right locations. The PDF is an accepted Internet standard, very well supported by the major Internet browsers. It is device independent and provides one to one representation of how the final document would look when printed. The PDF file may be displayed in the user's internet browser using a conventional PDF reader plug-in. The PDF file can be viewed or printed to a local low resolution printer for the final proofing. If changes are required the user moves back to the main HTML page to modify the selection and/or the variable data.

Then a new dynamic PDF file is generated that reflects the changes. The process continues until the user is satisfied with the document. After that the same references used to build the dynamic PDF file are sent for printing using the known XLC printing technology. Alternatively, the same generated PDF file would be sent for printing using conventional printing technology where the low resolution images would be replaced by the high resolution images by an OPI (Open Pre-press Interface) process before printing.

Although developed for the Internet front end, the technology can similarly be used by front ends other than Internet browsers.

25 DESCRIPTION OF THE DRAWINGS

The various features, characteristics and advantages of the present invention will become apparent to the skilled artisan from a reading of the following detailed description of an exemplary embodiment, when it is read in view of the accompanying drawings, in which:

FIGURE 1 is a system diagram illustrating an example proofing system in accordance with the present invention;

FIGURE 1A is a flow chart illustrating an example of steps which may be implemented in connection with the system of FIGURE 1 to custom design printed materials;

FIGURE 2 is an example of a first level screen display in accordance with a preferred embodiment of the present invention;

FIGURE 3 is an example of a second level screen display in accordance with a preferred embodiment of the present invention;

FIGURE 4 is another example of a second level screen display in accordance with a preferred embodiment of the present invention;

FIGURE 5 is an example of a closing screen display in accordance with a preferred embodiment of the present invention; and

FIGURE 6 is an example of a point-of-sale display card which may be produced in accordance with the present invention.

DETAILED DESCRIPTION OF AN EXEMPLARY EMBODIMENT

The following detailed description sets forth a preferred exemplary embodiment in accordance with the present invention. It should be noted, however, that those having ordinary skill in the art will recognize modifications and changes that may be made without departing from the spirit of the invention. For example, although the example embodiment is described in the context of an example system wherein a user utilizes the internet to access template information at a remote location and input user specified information, other arrangements are possible.

Referring now to FIGURE 1, an example proofing system constructed in accordance with the present invention includes a front end 2 which preferably is capable of establishing remote contact with an internet WEB site. A reference library, low resolution images, high resolution images, and other data may be stored in a memory 4 at the remote location. The front end 2 is typically located at the office of a

designer for the customized printed material to be prepared, e.g., at the office of a graphic artist employed by an advertising agency or a direct mail marketer. The front end 2 ordinarily includes a personal computer having at least a display screen, keyboard and a mouse, as well as appropriate internet browsing software. The memory 4, PDF builder 6, and high resolution color production printing system 10 are present at the remote location, e.g., at the facilities of a commercial printing service, and may be part of a computerized printer device and print driver system.

The front end 2 may use an internet browser or the like to establish communication with the remote location through an internet connection or other appropriate communication technique. For example, a commercial printer may establish a typical HTML-based World Wide Web site on the internet that allows customers password protected access to the services and products of the commercial printer. A customer seeking to design custom printed materials would then access the web page of the commercial printer and enter an area reserved for services and products offered by the printer. One option in the services and products area of the web page may be custom design of printed materials which, when finalized, would be printed by the commercial printer on a high-speed, high-quality print device, and subsequently delivered to the customer. Of course, other arrangements are also available.

In operation of such an example system, a graphic artist or the like working at the front end terminal 2 accesses the internet web page of the commercial printer and enters the area for customized design of printed materials. The PDF (portable document format) builder 6 may be implemented in a conventional way as part of a computer system at the remote location. The computer system may also operate as the server for the internet web page. The PDF builder-6 is used to create the image of the document to be printed based on reference data images, or other data from the memory 4, as well as user inputs at front end 2. A local printer 8 may be provided at the front end for producing hard copy, low resolution proofs of the final document, if desired by the user. Once the user is satisfied with the design, a print order can be

confirmed and high quality prints may be produced by a high resolution color production printing system 10.

An example operation of the proofing system illustrated in Figure 1 is illustrated in Figure 1A. More particularly, at step 100, a designer working at the front end station 2 utilizes a conventional internet browser and connection to access the commercial printer web page and enter the area in which customers may design their own custom printed materials. Typically, access to this area of the web page may be password protected and restricted to customers having established accounts with the printer.

As illustrated more particularly below in conjunction with Figures 2 through 5, the user is prompted to select an available template form (function block 102) and to provide selected or variable information (function block 104) for use by the PDF builder 6 to complete a proof of the custom printed material. The particular template forms available to the user may be tailored to the specific user. For example, a supermarket chain may have a number of available templates which would not be suitable for a beer distributor or direct mail marketer, and vice versa. Accordingly, the available templates may be predetermined for a particular customer and presented to the user in accordance with the sign-on information provided by the user in accessing the web page. The templates are preferably imaged in advance and displayed for the user on the HTML web page in PDF. These templates can be seen on the HTML page prior to customization.

With regard to function block 104, the user may select from a plurality of predetermined options. For example, the user could be prompted to select a specific type of package to appear on the custom printed material. (See, e.g., Figure 3, at item 2). Additionally, the user can be given the choice of selecting from a plurality of predetermined options or, if no predetermined option is suitable, providing the user's own variable information. (See, e.g., Figure 3 at items 3 and 4). The variable user information may be entered, for example, at the keyboard of front end 2.

The PDF builder 6 then creates a dynamic PDF file on-the-fly based on the selected template information, the selected or variable data provided by the users, and

the low resolution images based on the references selected. The dynamic PDF file corresponding to the custom printed material is generated by reading the PDF template file, inserting the appropriate image components and placing them in the proper locations, and writing a customized dynamic PDF file. The dynamic PDF file is then 5 displayed at the front end terminal 2 for proofing by the designer (function block 106).

Once the customized dynamic PDF file is displayed at the front end 2, the designer may choose to print the image at a relatively low resolution local printer 8 for further review (function block 108). Such an arrangement may be particularly advantageous, for example, if the printed material is multiple pages or cannot be 10 viewed on a single screen display. Also, the printed version may be circulated to others as needed for approval.

Next, the designer may either confirm the order, or may return to the main HTML page to modify the selection and/or the variable data. Thus, if the designer is not satisfied with the appearance of the printed material, the designer is again given the 15 opportunity to select an available template, etc. If the designer is satisfied, the commercial printer can proceed with printing the materials in the desired quantity (function block 114) and then distributing them as required (function block 116). For example, the printed materials could be delivered to a distribution center for a retail chain, or the commercial printer may post the materials through the mail to parties 20 included on a mailing list provided to them by the user.

If the commercial printer utilizes known XLC printing technology the same references used to build the dynamic PDF file are sent for printing by the XLC system. Alternatively, where the commercial printer uses conventional printing technology, the dynamic PDF file generated for proofing is sent to the printing system, and low 25 resolution images used in creating the dynamic PDF file are replaced by high resolution images by, for example, an open pre-press interface (OPI) before printing.

It should be noted that although Figure 1A illustrates control returning to function block 102 when the designer is dissatisfied with the appearance of the printed materials, ordinarily it should not be necessary to reselect or again input information

that is not to be changed. Additionally, it should be understood that the order of steps illustrated in Figure 1A can be modified without departing from the spirit of the present invention. For example, a user might choose to print a low resolution copy of the proofing version of the custom printed material prior to, or even in lieu of, display on a screen at the front end 2.

FIGURE 2 illustrates a sample first level screen display which may appear at front end 2 after a user initially accesses the proofing system. Briefly, the user is provided, for example, with a number of available templates such as a generic shelf display card (Shelf Talker Generic 1), a vertical banner, or an aisle display card (ELM Chill Aisle). It should be understood that these templates are merely for the sake of illustration, and other templates, of course, may be presented depending on the particular needs and desires of the user. The user may select a template by clicking on the appropriate choice with a mouse 2A.

Once the template is selected, a second level screen display appears at front end 2. FIGURE 3 illustrates a sample second level screen display menu appropriate for the selection of the shelf display card. A PDF version of the template is displayed at the top portion of the screen for reference by the user. This template is preferably imaged in advance and stored in memory 4. The user is prompted to select a package image to be included in the package area of the template. Additionally, the user is prompted to: (a) select a stored description or to enter a different description of the user's choosing; (b) select a stored price or enter a different price; (c) select the number of copies needed from the production printing system; and (d) to identify themselves. The identification of the user may be used for billing and/or distribution purposes in accordance with previously determined customer information.

Once all the necessary data is entered, the user may click on a button to indicate completion of data entry. Although the foregoing describes a single screen display page for entry of data, multiple screens could likewise be employed.

FIGURE 4 illustrates another example second level display. In particular, the screen display of FIGURE 4 may be used with an aisle display card (ELM Chill Aisle).

As with the example of FIGURE 3, the template is shown at the top portion of the HTML screen as a PDF image. As shown, the aisle display card template permits prices for a number of different products to be displayed. Such a template would be particularly useful, for example, to a supermarket chain or the like. The user prompts for data in 5 Figure 4 are different from those in Figure 3 due to the different information to be printed on the customized printed materials. Again, completion of data entry is indicated by clicking a button with the mouse 2A.

Turning now to FIGURE 5, a message may be displayed at front end 2 upon completion of data entry. This message screen provides the user the opportunity to 10 view the final document, as customized, prior to confirmation of the order. The final document can also be printed on a local low resolution printer 8 (Figure 1). If the user is not satisfied with the document, the steps employed in creating the document may be repeated as desired.

Turning now to FIGURE 6, an example is given of a final printed document 15 produced by the production printing system based on the shelf display template. An image of the selected package is displayed at the left hand portion of the shelf display. The right hand portion includes the user input description and price. After printing by the commercial printer, the final printed documents would typically be delivered to a distribution center of a retail store or the like for later display in individual stores.

20 While the invention has been described in connection with what is presently considered to be the most practical and preferred embodiments, it is to be understood that the invention is not to be limited to the disclosed embodiments, but on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

WHAT IS CLAIMED IS:

- 1 1. A method for creating customized material for printing, comprising
2 the steps of:
3 selecting a template;
4 obtaining a user-determined information for incorporation in said
5 customized material;
6 creating a dynamic portable document format (PDF) file based on the
7 selected template and said user-determined information;
8 displaying said dynamic PDF file to provide a proofing version of said
9 customized material; and
10 modifying the selected template or said user-selected information if
11 changes are desired in the proofing version of said customized material.

- 1 2. The method of claim 1, wherein said step of obtaining user-determined
2 information includes receiving a selection from a plurality of predetermined options.

- 1 3. The method of claim 1, wherein said step of providing user-determined
2 information includes receiving information input directly by a user.

- 1 4. The method of claim 1, including the further step of printing one or more
2 copies of said customized material on a production printer following approval of the
3 proofing version of the customized material.

- 1 5. The method of claim 4, including the further step of printing said proofing
2 version of said customized material for review prior to performing said step of printing
3 one or more copies of said customized material on said production printer.

- 1 6. The method of claim 1, including the preliminary steps of establishing an
2 internet connection with a user at a remote location and displaying to said remote user
3 a plurality of templates in portable document format for selection by said user.

1 7. The method of claim 6, wherein said step of creating a dynamic portable
2 document format file based on the selected template and said user-determined
3 information includes reading a stored PDF file corresponding to the selected template,
4 inserting at the proper locations in the PDF file corresponding to the selected template
5 components corresponding to said user-determined information to create said proofing
6 version of said customized material.

1 8. The method of claim 7, including the further step of printing one or more
2 copies of said customized material on a production printer following approval of the
3 proofing version of the customized material.

1 9. The method of claim 8, including the further step of printing said proofing
2 version of said customized material for review prior to performing said step of printing
3 one or more copies of said customized material on said production printer.

1 10. An apparatus for creating customized material for printing, comprising
2 an interface for a front end having a display screen and a user input device;
3 a memory which stores reference information and images; and
4 a portable document format (PDF) builder responsive to user information
5 received through said interface and selected reference information and images from
6 said memory to generate a dynamic PDF file representing a proofing version of said
7 customized material for printing and for displaying through said interface at the front
8 end.

1 11. The apparatus of claim 10, wherein said interface is an internet web page
2 connection.

1 12. The apparatus of claim 11, further including a production printer which
2 prints said customized material following approval by a user.

1 13. The apparatus of claim 12, wherein said production printer utilizes XLC
2 technology and operates on the same user information and selected reference
3 information and images from said memory used to generate said dynamic PDF file.

1 14. The apparatus of claim 12, wherein said production printer utilizes
2 conventional printing technology and operates on said dynamic PDF file to replace low
3 resolution images used in generating the dynamic PDF file with high resolution images.

1 15. The apparatus of claim 13, wherein the low resolution images are replaced
2 with high resolution images by an open pre-press interface before printing.

1 16. The apparatus of claim 11, further including a front end which includes a
2 display screen and a user input device which communicates with said PDF builder
3 through said interface.

1 17. The apparatus of claim 16, wherein said front end further includes a printer
2 operable to provide a hard copy of said proofing version of the customized material.

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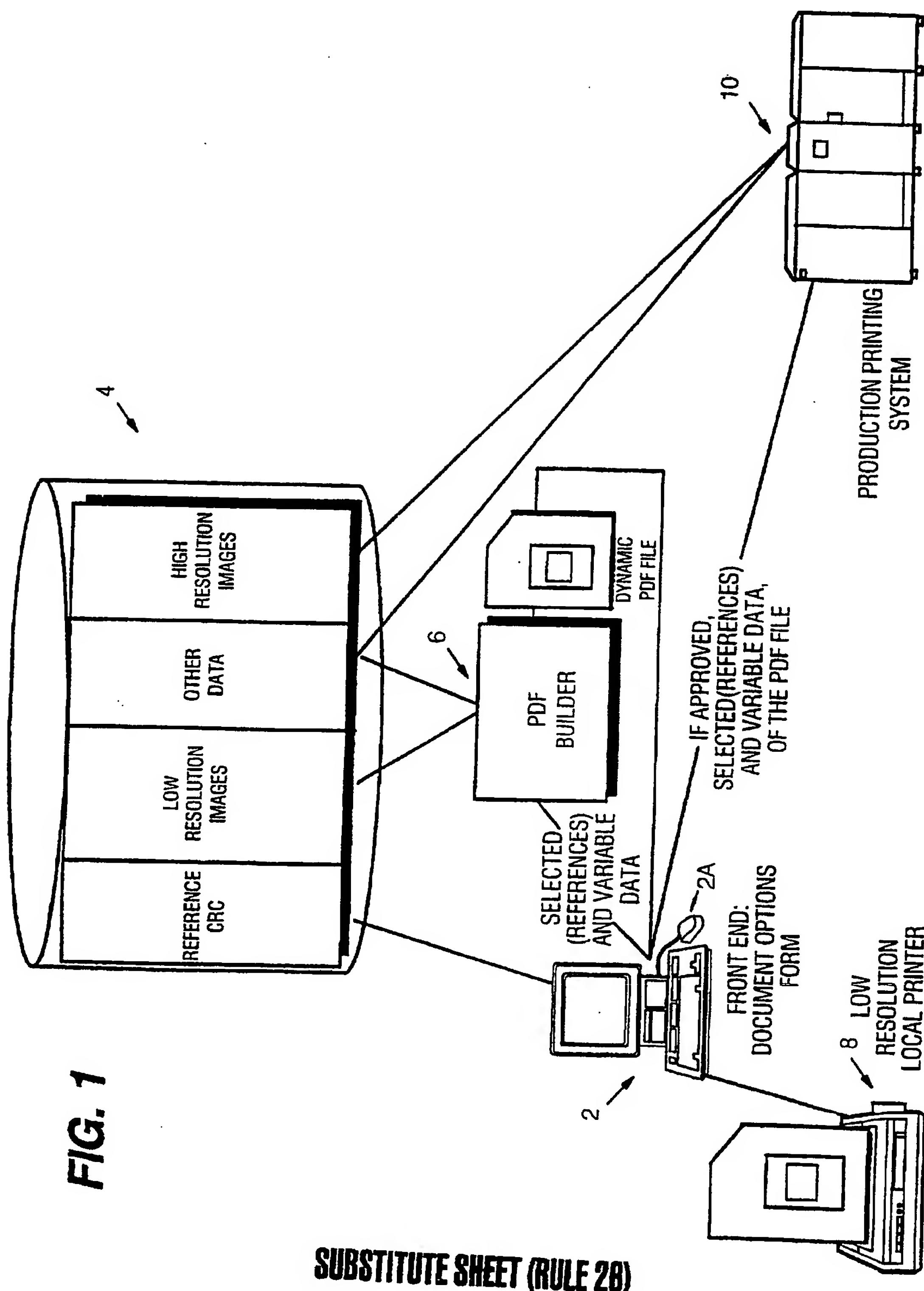
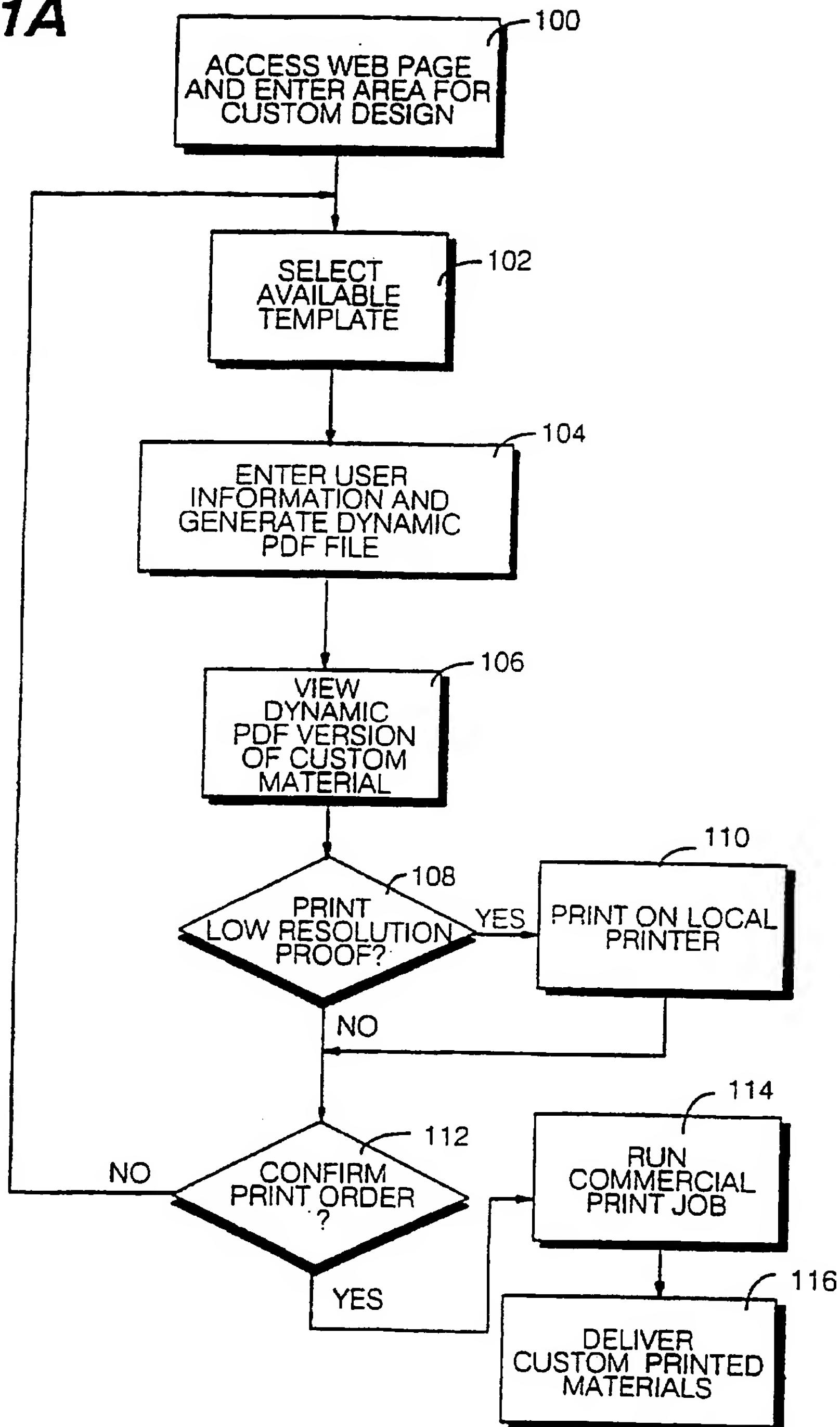


FIG. 1A**SUBSTITUTE SHEET (RULE 28)**

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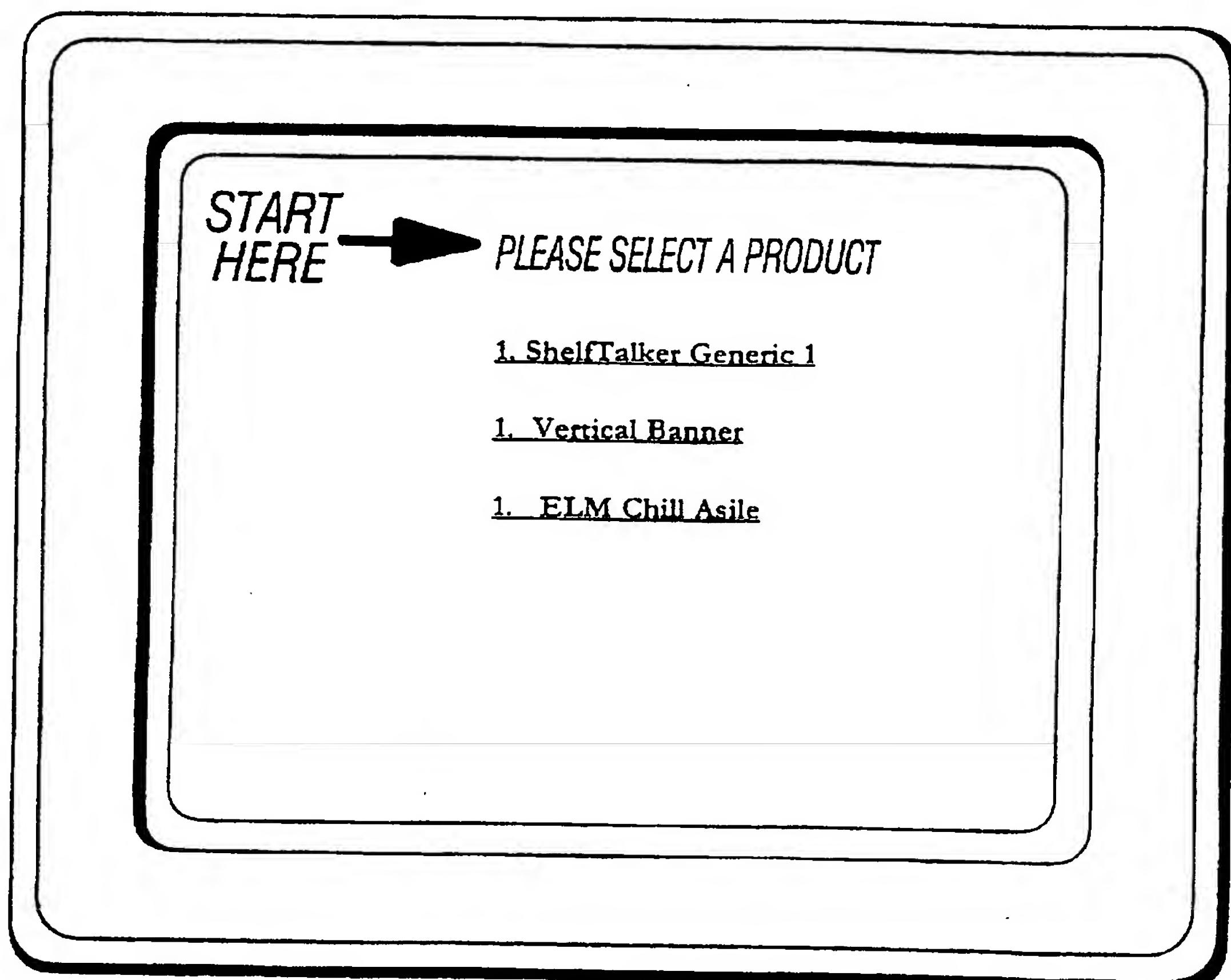
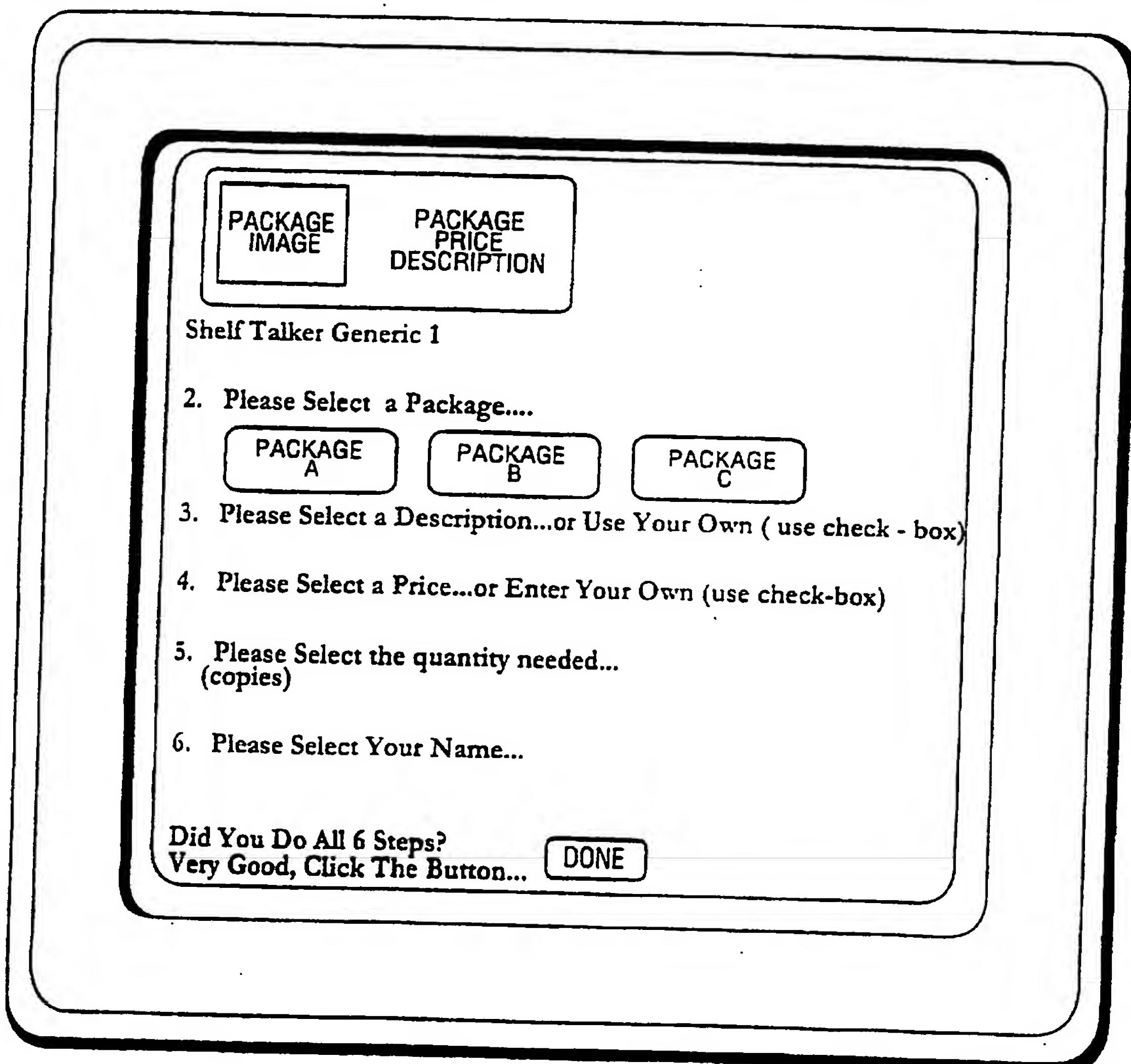


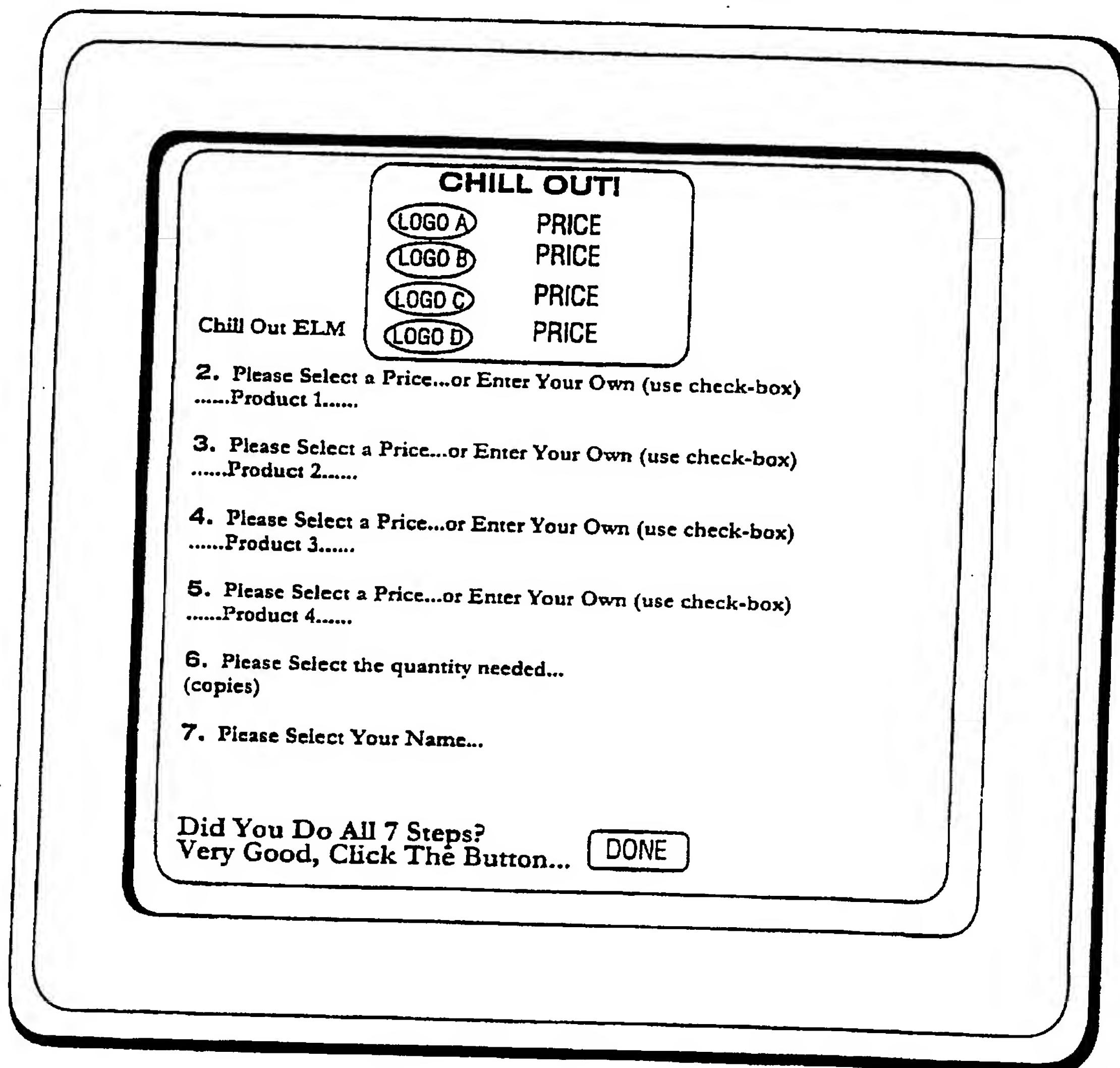
FIG. 2

SUBSTITUTE SHEET (RULE 28)

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**FIG. 3****SUBSTITUTE SHEET (RULE 28)**

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**FIG. 4****SUBSTITUTE SHEET (RULE 2B)**

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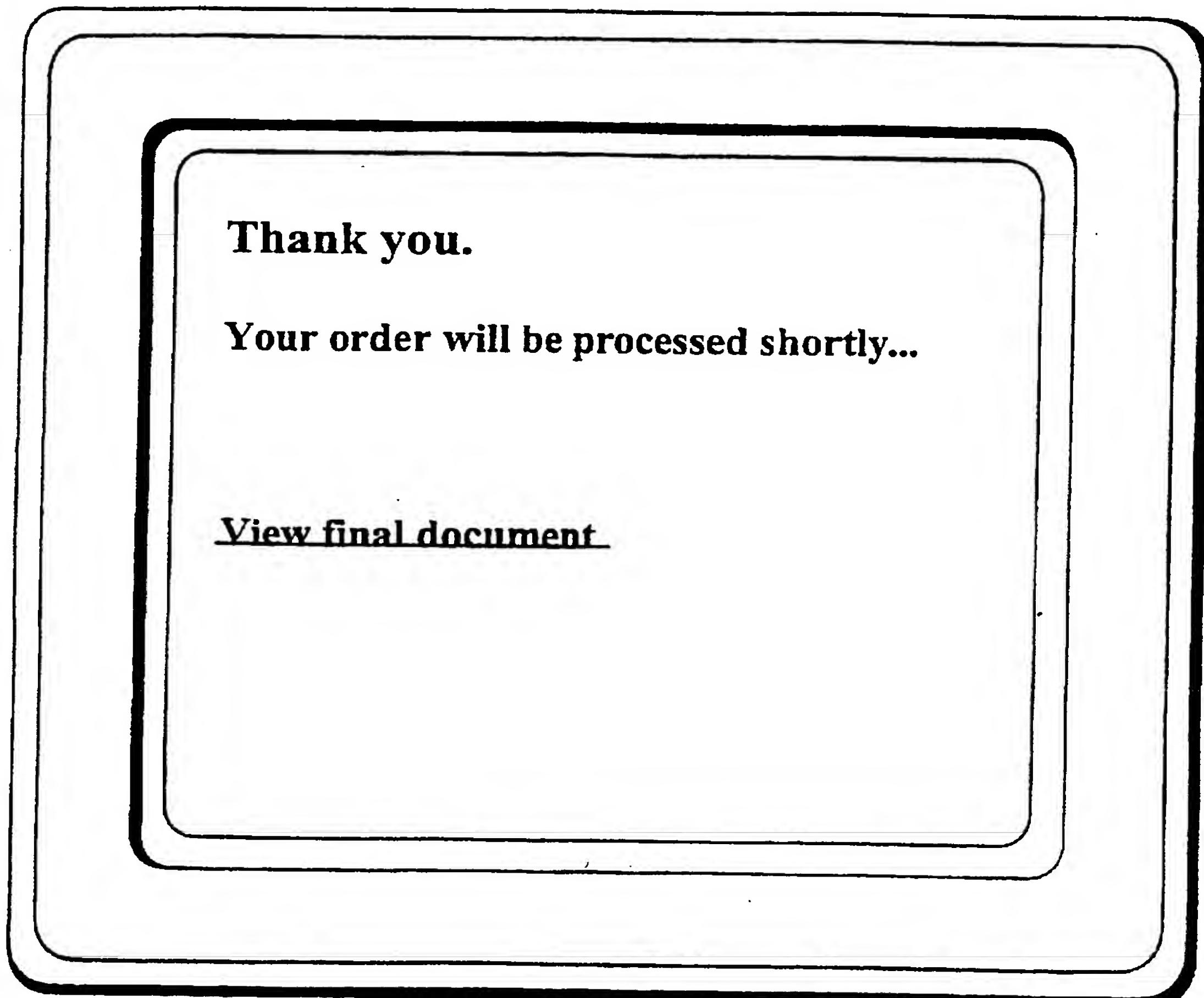
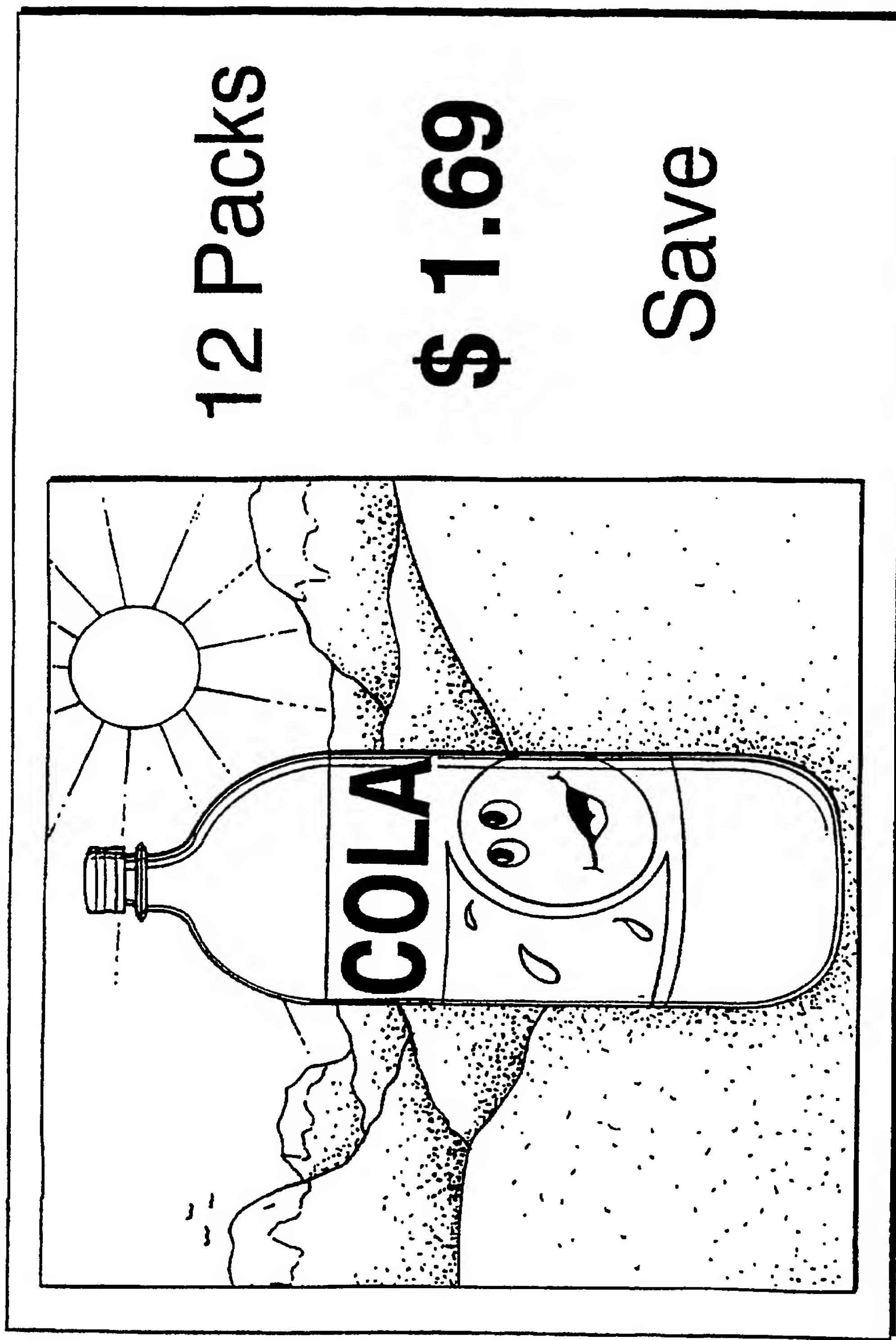


FIG. 5

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 97/14343

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G06F17/60

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 327 265 A (MCDONALD BRUCE A) 5 July 1994 see column 1, line 44 - column 2, line 35; claims 1-7; figure 1 ---	1-17
X	ANONYMOUS: "Virtual Image Editing" IBM TECHNICAL DISCLOSURE BULLETIN, vol. 39, no. 8, August 1996, NEW YORK, US, pages 93-96, XP000638148 see the whole document ---	1-17
A	US 5 303 342 A (EDGE CHRISTOPHER J) 12 April 1994 see abstract; figures 1,6-8 see column 2, line 24 - line 53 see column 5, line 62 - column 6, line 10 ---	1-17 -/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

Date of mailing of the international search report

10 December 1997

14/01/1998

Name and mailing address of the ISA

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Authorized officer

Gardiner, A

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 97/14343

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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